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VAASTU IN PERSPECTIVE OF TECHNOLOGY

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ABSTRACT

In this paper, an ancient Indian philosophy of architecture (Vaastu-Shastra) is explained and compared to the work of contemporary philosophers of technology. The knowledge of Vaastu is cognitively understood as the concept of instrumental understanding, sense- understanding, theoretical and scientific understanding that describes its own philosophical study. While comparing Vaastu to the modern philosophers of technology we are certainly reminded of the philosophies of Carl Mitcham, Albert Borgmann and Don Ihde in some or other way. The philosophical issues of these contemporary philosophers are very much interlinked to the Indian philosophy of Vaastu – for example (a) Mitcham's concept of technology from the ancient time till today, perceives technology as an object, knowledge and activity along with three ways of "Being-with" technology. (b) Secondly, Borgmann's analyses of pervasive influence of technology in human life from a different perspective - philosophically, socially, historically and scientifically, reflecting the way we have taken up the world both individually and collectively. (c) Thirdly, Ihde's cultural hermeneutic of technology as a hermeneutic praxis and (d) lastly, Polanyi's implicit and explicit knowledge. Interestingly, some points of agreement are noted between this very old form of knowledge with the modern philosophers of technology, which observes technology as object, process, and function.

KEYWORDS: Vaastu-shastra, knowledge, technology, being, object, philosophy.

Introduction

Vaastu-Shastra is an ancient Indian knowledge of the art and science of architecture as formulated in prehistoric times through the early modern period. Knowledge of *Vaastu-Shastra* is believed in Indian thought to have been passed down orally over thousands of years. Human beings have passed this knowledge down through the generations, with some modifications along the way to make it consistent with the needs of the time. Originally *Vaastu-Shastra* was conceived of as art only, but in more recent decades (since 1960) it has been viewed as a philosophy with some key insights that are consistent with modern science and technology.

Vaastu-Shastra can be thought of as a technological hermeneutic that seeks to understand technical action within the context of cultural traditions related to the ritual context of constructing houses and cities. *Vaastu-Shastra* serves as both an indicator of the tradition of technical action and *epistemologically*, guides technical *praxis*. Within Indian thought, *Vaastu-Shastra* is a particular way of thinking and engaging in the practice of architecture.

Brief History of *Vaastu-Shastra*

This ancient Indian knowledge of architecture is as old as the *Vedas*, which belong to the period of 1500-1000 BC. The first textual evidence for *Vaastu-Shastra* is found in the *Rig Veda*, where the protector of the house (*Vastospati*) is invoked (*Rig Veda*, VII. 54.1). Most of the materials from the sixth century BC to the sixth century AD have been lost and only fragmentary portions appear in the later works of *Vaastu Vidya* (Bhattacharya, 1986, pp. 129, 138). The two streams of *Vaastu-Shastra*, the *Nagara* and the *Dravida* Schools, imitate one another in many fundamental features and point to their common indigenous development within the Indian subcontinent (Bhattacharya, 1986, pp. 144, 148). The common architectural practices of the *Vaastu-Shastra* are accordingly, found in traditional architecture across India.

The principal source for *Vaastu-Shastra* within the *Vedas* is the *Sthapatya Veda* which deals explicitly with architecture in subordination to the larger *Atharva Veda*. *Vedic* knowledge such as that contained within the *Vaastu* was preserved through hearing, memorizing, and through the written texts themselves. *Vaastu-Shastra* can be considered to be an applied science approach that evolved continuously over a period of at least 2500 years, producing a large number of texts like *"Kashyapa Shilpa Shastra, Brihat Samhita, Viswakarma Vaastu Shastra, Samarangana Sutradhara, VishuDharm_odhare, Purana Manjari, Mayamata, Aparajitapccha, Silparatna Vaastu Shastra*, etc. Some of the great sages, originators, teachers and preachers of *Vaastu Shastra* are *Brahma, Narada, Brihaspati, Bhrigu, Vasistha, Vishwakarma, Maya, Kumara, Anirudha, Bhoja, Sukra* and others" (Rao, 1995, pp. xi-xii). The classic epics of *Ramayana* and *Mahabharata* have ample evidence of *Vaastu-Shastra*. In the *Mahabharata*, *Mayasabha* was built by *Maya* and *Indraprastha* and *Dwarka* were built by *Viswakarma*. The references to these two great traditional architects, *Viswakarma* of the *Aryans* and *Maya* of the *Dravidians* are found in both epics (Banerjee & Goswami, 1994, p. 34). The rituals associated with architecture as described in the later *Vedas* and its compilations until the 15th century AD, are still practiced as a part of the construction process in India today (Bhatacharya, 1986, pp. 2, 126).

The word "*Vaastu*" is derived from the root word, "*vas*," which means, "*to dwell*" (Kramrisch, 1976, p. 82). Here the word "*Vastu*" in general is defined as "*matter*" or "*thing*," which exist brick, stones, iron, etc. (Shukla, 1993, p. 187). The word "*Shastra*" in contemporary terms is understood to stand for 'theory', 'abstraction', 'literature', or 'text' with the context of its usage determining the exact equivalent meaning in English (Dubey, 1987, p. 27). Therefore, in the first instance *Vaastu-Shastra* denotes all kinds of buildings – religious, residential, military, auxiliary, and their respective component structures. Secondly, *Vaastu-Shastra* refers to town-planning, the laying out of gardens, constructing market places, roads, bridges, gateways, ports, harbors, wells, tanks, dams, etc. Thirdly, *Vaastu-Shastra* denotes articles of furniture such as chair, table, and basket cases, wardrobes, nets, maps, lamps, garments, ornaments, etc. It is also embrace site selection, soil testing, planning, design, and determining cardinal points for the orientation of buildings based on astronomical and astrological calculation (Shukla, 1993, p. 42-43).

The equipments used in ancient days for measurement were very simple and they were known as *Sutrashtaka* or the eight tools of measurements: scale, rope, cord, plumb line, tri-square, compass, level and sight (Chakrabarti, 1998, p. 40). The scale and rope were of prescribed length and used as measuring tools, while the rest were used in examining the site and for geometrical construction. According to *Acharya's Manasara-Silpashastra* (1981), the term '*Manasara'* means measurement for buildings and the yardsticks by which the achievements and standards of living of ages can be correctly evaluated. As such *Vaastu Shastra*, the classical Indian treatise on architecture, gives importance to mathematics and geometry for calculating and designing the good planning of the building.

Like most other sciences remotely connected with religion, in architecture too the scientific ideas and techniques have been integrated with philosophy and theology. This was so as the majority of the large constructions were temples. The construction of Hindu temples rarely used mortar but used a technique where the stones could be affixed to one another with the force of gravity. The technique followed in doing this was similar to the one used in the Roman aqueducts. The exquisite carvings were engraved after the stones had been fixed in their places. Thus the carving of figurines right up to the top roof of a temple must have been a demanding task. The richness of ancient Indian techniques of art and architecture are spread both westward and eastward. Some of the most renowned excavations of ancient Indian sites like Harappa and Mohenjodaro (now in Pakistan) have highlighted on ancient Indian civic art and the most refined civic sense during those era. The buildings discovered at the different strata of Mohenjodaro could be classified under the following heads: (1) dwelling houses (2) public baths of religious or secular character (3) temples of some kind and (4) raised platforms, possibly tombs (Shukla, 1993, p. 51).

It was only in the medieval period that town planning according to *Vaastu* principles was first depicted in *Arthashastra*. Some people believed that it like *Pataliputra* and others identified it with *Taxila* (Scharfe, 1978, p. 169; also see Kangla, 1965). The compilers of *Arthashastra* attached great importance to the orientation of the elements of the city planning because the scheme applies the plan of *Vaastu–Purusha–Mandala* (See fig-1, geometrical plan or ground plan).

In the modern days, for example, the cities of Jaipur and Chandigarh have followed the principles of *Vaastu-Purusha-Mandala*. Volwahsen (1969) has elaborately explained the geometric interpretations of Jaipur city. The design of Chandigarh by Le Corbusier (French architect) have also corresponded to the *Vaastu-Purusha-Mandala*, the architectural mechanism providing a blueprint for building in the *Vaastu Shastra* legend. Hence, the principles of *Vaastu Shastra* formulated 5000 years back by *maharishis* and *rishis* are still applied because of its practical and technical relevance

Principles of *Vaastu Shastra*

The guidelines and rules of *Vaastu Shastra* have been laid down clearly in several ancient texts, but the principles upon which they have been formulated are steeped deep in the Indian philosophy of Vedas. The importance of *Vaastu Shastra* lies in understanding the basic principles as it analyses the blueprint which provides for a design system (Patra, 2006).

Vaastu Shastra is essentially an art of correct setting whereby one can optimize maximum benefits of the *Panchbhutas* (five elements) of nature, earth's magnetic field and the rotational influence of the sun, moon and the other planets surrounding the earth, It has laid down several principles for constructing buildings. The fundamental principles of *Vaastu Shastra* are applied in constructing buildings such as houses, commercial complexes, industry layouts, towns, temples etc. There are five basic principles on which the great edifice of the *Vaastu* science of architecture stands (Patra, 2009). They are

1. the doctrine of orientation;
2. site planning;
3. the proportionate measurement of building;
4. the six canons of Vedic architecture;
5. the aesthetics of the building.

The doctrine of orientation: In Indian thought, the cardinal directions hold a particular signifi cance. The various associations given to the eight cardinal directions (northeast, east, southeast, south, southwest, west, northwest and north) help elucidate the orientation principles of *Vaastu Shastra* (Chakrabarti, 1998, pp. 101–102). The theory of orientation of buildings is secular as well as ecclesiastical, as laid down by Indian designers of structures, which consists in setting them in such a way that they may get maximum benefits from solar radiation. The fixing of cardinal points thus occupies a prominent place in *Vaastu Shastra*.

Site planning (Vaastu-Purusha-Mandala): *Vaastu Shastra* lays down various guidelines for choosing the proper site (Patra, 2007). It emphasizes strongly the examination of the soil, size, shape, taste, colour, smell and vegetation features of the land. If the plot of land is found to be satisfactory on all these criteria, then it is selected for the purpose of building a house, village, industry, town, fort etc. After the selection of land, the blueprint of *Vaastu-Purusha-Mandala* is provided for the grid that facilitates the inception of the design, and in addition to being the 'architect's square pad', where the concepts crystallize, each of its lines and divisions holds within it layers of meaning within which the intricacies of design unfold (Figure 1). The *Vaastu-Purusha-Mandala* adopts the shape of the site, and this functional attribute of the *Mandala* active in the mind of the designer in its ideal form of a square, acquiring a different shape in reality, is a primary example of its inherent flexibility. Not only does it adapt to the site constraints, but also it adopts the parameters of design requirements of contexts as diverse as the hot-and-arid state of Rajasthan and the wet-and-humid state of Kerala, as well as the variations in building materials, functional requirements and the social and political context in which it is used (Chakrabarti, 1998, p. 63).

The proportionate measurement of building (Maana): The third basic principle of Vedic architecture is *Maana*, the proportionate measurements. The measurements are divided into six categories – measurement of height, breadth, width or circumference, measurement along plumb lines, measurement of thickness and measurement of inter-space. The role of *Vaastu Shastra* in the system of measurement is to achieve harmony between the absolute and the quantifi able. Measurement mediates finality to an architectural concept, similar to the spoken word, which provides a frame over which the canvas of thought is stretched. Measure 'fixes' as well as 'evaluates' (Chakrabarti, 1998, p. 35).

The six canons of Vedic architecture (Aayaadi-Sadvarga): There are six main components of a building, base (*Aadhistaana*), column (*Paada* or *Stambha*), entablature (*Prastaara*), ear or wings (*Karna*), roof (*Shikara*) and dome (*Stupi*). The *Ayaadi* formulas1 are some of the aspects analysed to assess the qualities of the house (*Guna*). In short, *Aaya* means measurement of building = length × breadth (Shukla, 1993, pp. 211–217).

The aesthetics of the building: Aesthetics as a branch of philosophy deals with the nature of beauty. Applying aesthetic considerations to buildings and related architectural structures is complex, as factors extrinsic to spatial design (such as structural integrity, cost, the nature of building materials and the functional utility of the building) contribute to the design process. Notwithstanding, architects can still apply the aesthetic principles of ornamentation, texture, flow, solemnity, symmetry, colour, granularity, the interaction of sunlight and shadows, transcendence, and harmony. In Indian tradition, beauty is considered as *chanda* (moon); the structural aspect of building and its rhythmical disposition is like that of poetry (cf. Shukla, 1993, pp. 180–211).

These traditional principles contour buildings in multifarious forms, structures varied from one another to suit the different classes of buildings, to satisfy different functions, and they never present an identical view. As a result, *Vaastu Shastra* has been described as a body of knowledge, which has been sustained, developed and modified by successive generations of architects through many centuries. It implies a tradition of knowledge that has, at various times, been ordered and expressed (and so is handed down to us) in a range of texts, with a variety of titles.

Modern Users: Today the practice of *Vaastu Shastra* is fragmented beyond recognition. Indicative of this fragmentation is its use not as a whole architectural program but in bits and pieces that have little role to play in the definition of the contemporary architectural idiom (Tillotson, 1989, pp. 127–147). Its negation as an obsolete architectural program in the recent past has led to its usage in a secondary sense, where it is not allowed to interfere with the individualistic perception of the design problem and its solution—now resolved by modern methodology. It is not a part of the curriculum or discussion in any of the main architectural schools in India; and exposure to its built representation is via modern parameters of architectural appreciation. Besides the modern architect, the team of experts, whose collaboration is quintessential to the realization of the *Vaastu Shastra* program of architecture, has resorted to insulated and individual practices. They too are fast disappearing primarily because of their perceived irrelevance to the needs of modern India. Some of the fragments of *Vaastu Shastra* have adopted new meanings, where their fundamental purpose is obliterated by a kind of ritualism fashioned to hastily satisfy an inner conflict without the complementary architectural manifestation. Its complete redundancy as an architectural program, which in its long history had thrived with the variables of climate, topography, life styles, as well as the social, political and economic situation of its land, render all the allied building crafts superfluous (Chakrabarti, 1998, pp. 22–23).

The practitioners who today use or make references to *Vaastu Shastra* could be identified as the following: the 'Indian' architect, who in search of his identity makes emphatic references to the traditional building vocabulary; the *Vaastu* pundit, who provides guidelines largely regarding the orientation principles that dictate the layout of the building; the astrologer, for whom the *Vaastu Shastra* belongs to the same tradition as astrology and the points of intersection between the two; the traditional craftsman, who today is bereft to the tutelage of the traditional team and finds application of his skill primarily in the conservation of old buildings; conservation architects, who document and analyze monuments for the sake of repairing and preserving them; and art historians who analyze them to develop a theoretical discourse on history (Chakrabarti, 1998, p. 23).

Traditional Context

Vaastu Shastra is discussed below through its culture and heritage (Patra, 2006). Culture is the way a society lives, how its people behave and its religious expressions. These alter with time and place. In particular, the way humanity sees itself in relation to its surroundings is the fundamental reflection of human culture. Today, we are destroying nature in such a way that whenever nature stands in the way of what we want she is pushed aside. In the Indian perception, a human (*manav*) is a *being* that respects nature and a demon (*danav*) one that misuses nature. History has shown that the cultures which are not respectful to nature do not last long – they bring about their own downfall (Prime, 1994, pp. 18–20).

Heritage: Heritage springs from human culture. This is part of human life, from which we learn who we are and how we live, and pass our values to the next generation. Though we have received so much from previous generations and civilizations, yet we act irresponsibly and neglect our heritage. People have become estranged from their natural surroundings and forgotten the time-honoured ecological values of their culture.

Therefore, traditional wisdom in the form of the planning of human settlements, ancient texts governing building activity and the rationale of technology and material use are important points of reference. Traditionally, religion also played an important role in controlling human aspirations and ensuring interdependence and sustainability. A point of view that requires serious consideration is that the earlier generations realized that the single largest factor that could affect sustainable development was the built form and the city plan. What we today term behavioral sciences was encompassed in the traditional building and planning strategies. What is now known as planning and architecture was in fact the most powerful tool that was devised to control behavioral patterns of the entire society. It was mystified around religious beliefs, which aimed at achieving co-existence with nature. To understand the rationale for human settlement design as contained in the *Vaastu Shastra,* one should understand the manner of devising a system of controls of human settlement patterns for sustainability, while respecting the social and cultural fabric of the citizens of the settlement (Patra, 2006).

Today, *Vaastu Shastra* has become more relevant for modern man because the environment has gained importance as a result of pollution of air, water and land.

The common man feels more stressed and dissatisfied due to a lack of space and pollution as compared to old times. *Vaastu Shastra,* which balances the five basic elements of nature namely water, fire, air, sky and earth, and the location, direction and disposition of construction, which have a direct impact on life, has become a necessity now. The principles of *Vaastu Shastra* can be easily tuned, extended and modernized to meet the needs of man because the basic needs of man never change (Patra, 2009). *Vaastu* explains that because of the dynamic change, population pressures and land speculations, the resultant built form of Indian cities today is complex, amorphous and chaotic. It no more reflects a coherent response and ambience to its environmental context. The situation is reaching a crisis stage and a sustainable ecological relationship with built form is missing in new settlements. In the present day, man is more than ever before aware of a loss of totality, wholeness and harmony. There is fragmentation and alienation of man at all levels—individual, societal, psychical and cosmic. Looking at the damage that our cities and development have inflicted upon the environment, one of the prime agenda is to explore the possibility of creating a living environment, which is self-sufficient, ecologically balanced and culturally stimulating. So, we need to look at the fundamentals of human settlements, and evolve a system whereby we can establish a harmony among settlements, nature and people; and also the changing pattern of living (Padam, 1998, p. 169, 170). Hence, if we, as a collective are to combat our own thoughtlessness, it is imperative to dovetail the wisdom of the past with the technological advances of the present and future. The need of the hour is to clearly rationalize the thought processes and systems of implementation behind the sustainable settlements of yore as well as the disastrous results of 'modern' practices.

Understanding of Technology and *Vaastu*

Philosophy of technology is the study of technology, objects and technical processes, and the term 'technique' refers to the actual application processes. Thus, technique is understood as: - (1) individual technical skill (artist, physician and craftsman), (2) technique relating to crafts, (3) engineer-moderate technology (Irrgang, 2001, p. 12), (4) philosophical reflection on technique is the system of sciences (Wolff, 1983), (5) natural science (positivism), (6) a system technology in the sense of technolization, natural science, industry and politic and (7) modern technology (system technology as a social project). This summary enumerating may be considered however only as rough heuristic (Irrgang, 2001, p. 13). Any technique derived from technology has its material, instrumental, or abstract structural components. The designing self may select its material, instrument and structural models as techniques for building an artifact. The selections are made from all possible elements in these components and at every step of the process of building as an object and create style. A sum of technical choices made at various points of construction gives character to a formal structure. For this reason, a constructing technique is embodied always in style, and style in a particular artifact (Choe, 1989, p. 98).

The primary developments of recent philosophy of technology are examined with emphasis upon issues which might also be of greater interest to philosophers of science as these include epistemological issue (Ihde, 2004, p. 117). Philosophy of science today is much more heterogeneous. It retains many of the epistemological concerns of its earlier 'analytic' heritage. In contrast, philosophy of technology has primarily drawn its philosophers from the praxis traditions (Ihde, 2004, p. 118). Bunge in *Philosophical Inputs and Outputs of Technology* sharply distinguishes science from technology. Pure science, for Bunge, remains ethically neutral, culture-free, and objective. Whereas, technology far from being ethically neutral as pure science is involved with ethics and wavers between good and evil (1979b, p. 172). For Bunge, (true) technologies derived from science are modern technologies. This latter distinction is virtually identical to Heidegger's view concerning modern technology (Ihde, 2004, pp. 118, 120). For Heidegger, modern technology is dependent upon science and *vice versa* (Heidegger [1954] 1993, pp. 311–341).

Some degree of difference between science and technology is maintained by most 'analytically' oriented philosophers of technology. For example, Joseph Pitt's *Thinking about Technology: Foundations of the Philosophy of Technology* (2000), deals quite explicitly with the technological infrastructure of science which he relates to scientific change, often brought on or stimulated by improved instrumentation (Ihde, 2004, p. 121). If a distinction between science and technology is one end of the continuum, the thorough blending or hybridization of science and technology, usually now termed *technoscience*, forms the other end. The two most prominent figures form what is usually called "science studies". Science and technology, hereafter *technoscience*, has clearly gained enormous prominence in the contemporary world culturally, physically, and epistemologically. The term "*technoscience*" deliberately binds two histories, that of technologies which go back as far as all human origins and that of science which may be thought to have a different and later history. Yet, however, these two histories today belong together in a *hybrid history* (Ihde, 2004, p. 121). Ihde in *Technics and Praxis* (1979) has previously argued that *all science in its production of knowledge is technologically embodied.* This is more than to say that science uses instruments (technologies), but it uses these technologies in unique and critical ways in the production of its knowledge. Here, *Vaastu Shastra* as an interlinking of science and technology is very much identical with Ihde's concept of technoscience, which is produced by human, either directly or indirectly implies bodily action, perception and praxis (See Ihde, 1991). The knowledge of *Vaastu* understood as the concept of instrumental understanding is part of a more comprehensive conception of understanding that describes as its own philosophical study. As a cognitive understanding, *Vaastu* (architecture, technology) covers at least three components known as –

- Instrumental Understanding such as *know – how*.
- Sense- Understanding such as interpretation of signs, symbols and action
- Theoretical and Scientific Understanding

Vaastu-Shastra, as a theory of art and science, interconnects the understanding of technology.

In "*techne"* man works his being out and articulates himself. *Praxis* is the prime *techne.* It is not the mere application of theories, vision or attentive outlook, but is an active impetus and base. In India we often use the terms *Prayukti Vidya* and *Prayodyogika Vidya* to highlight the practical or applicative aspect of knowledge. *Prayoga* is an application, which is both test and base of knowledge. Doing is the best of knowing and learning. Theory/practice, thought/action, theorisation/application, pure knowledge/applied knowledge – whatever pair of terms we prefer, the fact remains that they are integrally related, interpenetrative and interactive. All these pairs represent the two main aspects of our nature, cognitive and conative (Chattopadhyaya, 1996). Technology as a branch of knowledge in the composite universe of art and science merits some elucidation. Technology has been conceived in many ways, for example as autonomous, as 'standing reverse', as liberating or enlargemental force. The Greek root word of technology, "*techne"* (art) and "*logos"* (science) mentioned earlier is the basic justification of recognizing technology as closely related to epistemology- the discipline of valid knowledge, and axiology- the discipline of freedom and values. It is in this context that we are reminded of the definition of man as *homo technikos.* In *Sanskrit*, the word closest to *techne* is *kalā*, which means any practical art, mechanical, or fine art. In Indian tradition, in *Saivatantra*, for example, among the arts (*kalā*) are counted as drama, dance, music, architecture and knowledge of dictionary, encyclopedia and prosody. The closeness of the relation between arts and sciences, technology and other forms of knowledge are evident from these examples and were known to the ancient.

The human quest for knowledge involves the use of both head and hand. Without mind, the body is a corpse, and disembodied mind, a bare abstraction. Even for our appreciation of what is beautiful and the creation of what is valuable, we are required to exercise both our intellectual competence and physical capacity. The ways of classification of arts and sciences are neither universal nor permanent. The great sage Manu speaks of a *vidya*, viz., *Atma-vidya*, knowledge of self or of spiritual truth. Two other words, which have been frequently used to denote different branches of knowledge, are *jnana* (knowledge) and *vijnana* (science). While *jnana* means knowing knowledge, especially the higher form of it; *vijnana* stands for the act of distinguishing or discerning, understanding, comprehending and recognizing. It means worldly or profane knowledge as distinguished from *jnana*, knowledge of the divine. It must be said here that the division of knowledge is partly conventional and partly administrative or practical. It keeps on changing from culture to culture and from age to age. It is difficult to claim that the distinction between *jnana* and *vijnana* or that between art and science is universal. It is true that even before the advent of modern age, both in the East and the West, two basic aspects of sciences started gaining recognition. One is the specialised character of what we call scientific knowledge. The other is the concept of *trained skill*, which was brought close to scientific knowledge (Pande, 1999, pp. xxix-xxx). The defining characteristic of technological knowledge, however, is its relationship to activity. Although, technological knowledge is considered to have its own abstract concepts, theories, and rules, as well as its own structure and dynamics of change, these are essentially applications to real situations. Technological knowledge arises from, and is embedded in human activity, in contrast to scientific knowledge, for example – an expression of the physical world and its phenomena (Herschbach, 1995). *Vaastu,* as a process, itself consists of the acquisition and application of knowledge concerning technique, or ways of doing things. *Vaastu-Shastra* involves the practical skills of knowing and doing. It also makes use of formal knowledge, but its application is interdisciplinary.

In India, the Science of Architecture and Civil Construction was often known as *Sthapatya-Shastra.* The word *Sthapatya* is derived from the root word *Sthapana* i.e. 'to establish'. The technique of architecture is both art and science; hence it is known as *Sthapatya-Kalā* or *Vaastu-Kalā* (the word *Kalā* means an *art*). From very early times, the construction of temples, palaces, rest houses and other civil constructions were undertaken by professional architects known as *Sthapati*. Even during the *Vedic* times, there existed professionals who specialised in the technique of constructing chariots and other heavy instruments of war. These professionals have been referred in the *Rig Veda* as *Rathakara*, which literally means 'chariot maker'. *Vaastu* principles were put into practice, by use of natural building materials, local construction *techniques* and architectural details that have evolved over times depending upon the local conditions including weather and available materials. There is a long-standing interest in the use of instruments in ancient India. The lofty temples of the past and *Post-Vedic* ages, or the artistic skills in the minute stone and metal curving, bring us to appreciate the fact that instruments for carrying great loads and architecture, in one hand, and the instruments with sharp needle points on the other must have existed in some way or the other. The equipments used in ancient days for measurement were

very simple and they were known as *Sutrashtaka* or the eight tools of measurements such as scale, rope, cord, plumb line, tri-square, compass, level and sight (Chakrabarti, 1998, p. 40). The scale and rope were of prescribed length and were used as measuring tools, while the rest were used in examining the site and for geometrical construction.

The knowledge, instruments, techniques, tools used in *Vaastu* has characterized mankind since its ancient days, when used by engineers in the modern world or when engineers aligned themselves with science in regularly applying scientific knowledge to technical practice.

(a) ***The earliest philosophies within the most primitive technologies were part of traditional canonical cultures:*** *Vaastu* was accompanied by the "knowledge" embedded in mythology- where we might talk about myths as embryonic project designs. Practitioners either used natural tools for adaptation to the natural environment in an organic style of technology; or else they began the conscious introduction of newly devised tools, as instruments for creating a new environment ("second nature"). Two principal ways of reflection appeared in these early cultures: one insisted on maintaining the existing natural and social order by way of specific practices (e.g., in ancient China) or ways of preserving harmony between society and nature (e.g., in India); the other involved aggression against or attacking nature or the natural environment in the name of human society (Mumford's "myth of the machine", including the organised social activities of "megamachines"). Techniques or knowledge existed without science, and science without technology. In antiquity, handcrafts yielded objects of art; though philosophical/scientific knowledge might be involved, there was no orientation toward experimental sciences as the modern sense, nor were there science-based production methods. Sometimes, mechanical inventions were devised to illustrate science, to show the power of scientific demonstrations, or to amaze the public. But these had no impact on handcrafts (Lenk & Maring, (eds), 2001, p. 33).

(b) ***The beginnings of a design culture appeared in the Renaissance or the New Age:*** *Vaastu* in a new age joined to experimental science and experimental techniques, thereby combining craft techniques with scientific technology.

(c) ***The transformation of modern Vaastu practice and scientific technology into a true design culture:*** This transition came into three stages: (i) engineering before the emergence of the engineering sciences (more technicians than engineers); (ii) technology as applied science and the beginnings of engineering sciences (engineering practice takes on a definite structure); and (iii) the organization of modern engineering practice, including interdisciplinary research and systems engineering.

Thus constituting of *Vaastu*, in the full, modern sense of that term, is a consequence of modern science. It is this science that furnishes the theoretical grounds for efficacious doing. This not only rapidly led to detailed knowledge of the natural world, which allowed for more adequate explanations of the success of many techniques already used. It has also inaugurated a process by which newly acquired knowledge was immediately applied toward the creation of new techniques and was even sought for the sake of some technical application.

Contemporary Philosophy and *Vaastu-Shastra:* Philosophical Issues

Carl Mitcham in *Thinking through Technology: The Path between Engineering and Philosophy* (1994) identifies the most important traditions of critical analysis of technology as the engineering approach, which assumes the centrality of technology in human life, and the humanity approach, which is concerned with the moral and cultural boundaries of technology. The word "technology" can be seen as both subjective and objective or sometimes both in the concourse between engineering and the humanities. The engineering philosophy of technology (EPT) and the humanities philosophy of technology (HPT) each speak to the issues of engineering design, the distinction between tools and machines, and to engineering science itself as a discipline and way of knowing and being with technology. Mitcham looks at technology as it is experienced in everyday life: (1) as material objects from kitchenware to computers, (2) as knowledge, including recipes, rules, theories, and intuitive "*know-how*," (3) as activity through design, construction, and use, and (4) as volition or the will to use and understand technology. He proposes this broad four-fold typology as a means to assess, employ, and engage with technology. He also discusses three suggestive but ultimately inadequate ways to "*being with*" technology: ancient skepticism, enlightenment optimism, and romantic uneasiness and finds each of them seriously deficient in dealing with technology in the modern world.

The parallels between Mitcham's concept of technology and the knowledge of *Vaastu-Shastra* as object, knowledge, and activity are striking. As such, (1) *Vastu* as technology (as techniques) is the object that humans have used, i.e. from primitive tools in the ancient days to the most complex technological in the present days. (2) *Vastu* as technical activities is the invention, discovery, research and development, including the basic designs, final designs, including the organizing of manufacturing facilities, and thoughtful designing or planning the embodiment of models (for example, *Vaastu Purusha Mandala*) into actual implementation. (3) *Vastu* as technical knowledge is the most specialized theoretical scientific technological systems which involve engineering knowledge or *"know-how"* and it can be only gained thorough scientific practice. Thus, It is a knowledge which is created by activity such as - crafting, inventing, designing, manufacturing, operating, maintaining etc. and through this activity both the structure and substance of technological knowledge can be identified, and generalized to instruction.

A philosophical colleague of Mitcham is the well-known German-American philosopher of technology at the University of Montana, Albert Borgmann. A student of Heidegger, Borgmann, in his seminal work, *Technology and the Character of Contemporary Life* (1984), chronicles how and why the promise of technology to improve the quality of life has proven quite limited. The fundamental features of modern technology consist of what he terms a "*device"*, i.e., *"a black-box"* object or tool that can be used by someone but with very few of the users actually understanding the thing itself, how it came to be, and what it fundamentally consists of in its essence. These devices, in turn, are situated within a larger and encompassing device paradigm that leads to rampant consumerism and distances the users from nature and from one another. Borgmann's response to the device paradigm is to urge a return to what he terms focal things and focal practices.

According to Albert Borgmann, in *Technology and the Character of Contemporary Life* (1984, p. 302), the promise of technology, in improving the quality of life, has turned out to be inherently limited. Technology must be seen for what it really is, and what it can offer while distinguishing it from 'focal things and practices' which can provide the requirements necessary to achieve fulfillment in life. Borgmann's response to the device paradigm is to urge a restoration of what he calls focal things and practices. The notion of the 'device paradigm' means viewing technology exclusively as a device (or set of devices) that delivers a series of commodities, and evaluating the technical features and powers of such devices, without having any other perspective. "*Focal things require a practice to prosper within"* (Borgmann, 1984, p. 196). A focal thing is something of ultimate concern and significance which may be masked by the device paradigm and must be preserved by its intimate connection with practice.

Secondly, Borgmann in *Holding On To Reality: The Nature of Information at the Turn of the Millennium* (1999: p. 282), attempts to propose a theory of information ethics by focusing our attention on the multi-layered relationship between information and reality. He emphasises the need to obtain an appropriate balance between these different layers which include natural, cultural and technological information. The central structure of information is a relation of a sign, a thing and a person within a particular context. Borgmann discusses three levels of information – natural, cultural and technological. Natural information is described as "information about reality" and represents the ground state of information and reality. This informs us about the ancestral environment of the human family and pivots around the use of natural signs such as the clouds, slopes, rivers and embankments. With the rise of literacy, our lives started being mediated greatly by cultural information which Borgmann describes as "information for reality". Cultural information is preceded by human culture and relies on conventional signs such as letters, texts, lines, graphs, notes and scores. An architectural drawing or a musical score are examples of this kind of information, which helps to shape our reality in particular ways. The uses of the "*grid*" or a "*map*" are examples of how particular cultural constructs have helped to frame our reality in certain spatial forms.

Thirdly, information that we are primarily dealing with in the present times is "technological information" which Borgmann describes to "information as reality". Finally, Borgmann regards philosophy of technology as *Meta-theory*. He describes the technical action as knowledge, process and a product, as well as production and consumption (Borgmann, 1984, p. 14). Technology justifies a new form of traditional cities which are interpreted as consolidated technological structure which can be shaped in modern life-styles (Borgmann, 1984, p. 246).

Similar to Albert Borgmann's three levels of information known as natural, cultural and technological information (*vide infra*), *Vaastu Shastra* too has ample information through records, reports, maps, charts, symbols, grids, graph, texts, letters, lines, notes, natural signs, etc that has been transformed into reality ever since our ancient days. Cultural information reveals reality much more widely and incisively than natural signs ever could have done. But cultural signs normally provide information for the reordering and enriching of reality. Secondly, *Vaastu-Shastra*, an experimental science was used and practised from our forefathers and with the rise of literacy; our lives started being mediated greatly by cultural information that has been described by Borgmann as "information for reality". Thirdly, the uses of "grid" or a "map" are examples of how particular cultural constructs have helped to frame our reality in certain spatial forms, which is identical to one of most important principles of *Vaastu-Shastra* known as *Vaastu-Purusha-Mandala* which comes under the Site Planning. It is a diagram of square grid or a map used for planning site. *Vaastu-Purusha* is a form of man in a calculated site, characterised by the symbols of zodiac signs, constellations and planets that represent the entire solar system and make the site, house, palace, village, and city etc. a micro-cosmic aspect of the macro-cosmic *Purusha* or *Vaastupurusha*. As a rule its shape is square, which is the fundamental form of Indian architecture. The square form of *Vaastu-Purusha* can be converted into a triangle, hexagon, octagon and circle of equal area and

retain its symbolism. Once the orientation of the site is established, *Vaastu Purusha Mandala* or the ground plan is superimposed on the site. *Vaastu Purusha Mandala* is considered a model of the Universe and provides the basis for architectural design. It is a metaphorical expression of the plan of the Universe and depicts the link between people, buildings and nature. Here *Vaastu* means environment, site or a building. As a concept, it extends to include a village, town, a country or indeed the whole earth in all its

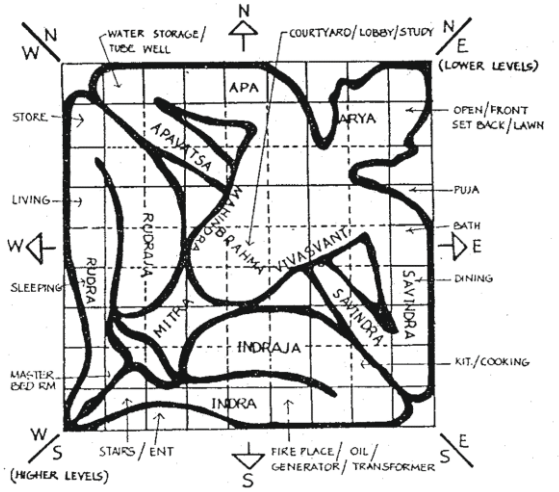

Fig. 1: The *Vaastu-Purusha-Mandala* is the clearest model of the Universe and provides the basis for architectural design. *Vaastu Purusha Mandala* is an important factor in constructing building. As a rule its shape is square, which is the fundamental form of Hindu architecture. The grid-square form of *Vaastu-Purusha* can be converted into triangle, hexagon, octagon and circle of equal area and retain its symbolism.

manifestations. When a building is in a perfect state or order, it is viewed as *Purusha*, the 'man' of the universe, representing pure energy, soul or consciousness; a kind of creative intelligence in the universe. *Mandala* means an astrological chart or a diagram. It relates to orientation because the earth is essentially demarcated by sunrise and sunset, by east and west, north and south. It has been so universal that it could be applied to an altar, a temple, a house, a city or the entire cosmos (Kramrisch, 1976 & Shukla, 1993).

According to Don Ihde, a phenomenologist under the influence of pragmatism in his book, *Technology and the Lifeworld* (1990), focuses on human-technology relations and the cultural embeddedness of technologies. Following a relativistic ontology, he draws a distinction between the "direct bodily and perceptual experiences of others and the immediate environment" and "technologically mediated experiences" (Ihde, 1990, p. 15). Ihde mentioned in *Technology and the Lifeworld* (Ihde, 1990, p. 24), technology is a certain way of practice and thinking and cultural hermeneutic of technology is the hermeneutic of Praxis. Ihde's concept of technique hermeneutic and technique phenomenology requires action theory, which requires implicit knowledge in technical handling. Technical action has a cultural background. In addition, many cultural practices have technical implications and background since they cannot be carried out without specific technical abilities. So certain form of technical acting can attain such cultural self-meaning and will be experienced from the cultural process of the total development. Technique hermeneutic is interpreted and characterized by implicit knowledge (Irrgang, 2001, p. 86).

Vaastu as a technological hermeneutic attempt to understand traditional technical instruments and the civilizations are given great importance for the interpretation of technical action. As such, *Vaastu* as a vast knowledge is an indication for the traditional technological action and epistemologically – it is explicitly used for reconstruction of technological Praxis. The application of *Vaastu* in a certain way is a sort of thinking and practice that is found to be identical to what Ihde had mentioned in *Technology and the Lifeworld* (Ihde, 1990, p. 24). As such, *Vaastu-Shastra,* an ancient science of architecture, is the process through which a work of architecture comes into being, and first and foremost design is a discourse and a form of inquiry. Design is, therefore, an evolutionary learning process, a process of exploration, discovery, understanding and interpretation, i.e. it is fundamentally a hermeneutic process. In this context, it should also be noted that *Vaastu-Shastra* (Patra, 2006) had striking similarity to the points made by Heidegger in *"Bauen, Wohnen und denken"* the lecture given on August 5, 1951.

It was Polanyi (1966) who first mentioned the difference between implicit and explicit knowledge and the inherent varying value of implicit knowledge. He also insisted that tacit or implicit knowledge is the basis of creativity. According to him, implicit knowledge is highly personal, context-specific and therefore hard to be formalised and difficult to communicate to others (See Polanyi, 1966). For example, in order to ride a bicycle, we need to know how to keep our balance. We do not think about whether we should steer to the left or right to avoid falling off and if we were asked, we would be unable to articulate what exact knowledge is needed. This implicit knowledge is rooted in our everyday behaviour and is always connected to a specific context – a specific technology, a profession or a community. Our "*know how*" the practical skills or expertise that allow us to work efficiently and effectively and not always have to think about detailed ways of solving a problem, but simply doing it – has its origin in our implicit knowledge (Kogut & Zander, 1992, pp. 383-397). However, implicit knowledge also has a cognitive dimension; we posses it in form of embedded mental models, belief and perspectives, so that we regard it as reliable and indisputable (Ryle, 1949). Implicit knowledge is knowledge housed in the human brain, such as expertise, understanding, or professional insight formed as a result of experience.

Michael Polanyi (1966), in his work "*Implicit knowledge*" suggests, that the phenomenon of implicit knowledge accounts from the fact that we know more than what we are able to say. Polanyi considers how we recognise the face of an acquaintance; we know the appearance of the face in its entirety by 'attending form' the tacit particulars and 'attending to' the explicit whole of the face. Although, we can delineate the face among crowd of people, we are often unable to articulate precisely how we know the face. Thus, Polanyi argues, implicit knowing is the foundation for all knowledge. This makes it a phenomenon of recognising and re-knowing feature (Polanyi, 1985, p. 14). The other feature of the things is not theoretically recognised, but mediated in practical exercises (Polanyi, 1985, p. 25). Knowledge is usually divided into theory and practice in epistemological discussion. Theory is understood as *knowing – what* and practice is practical *knowing – how* (Ryle, 1949). It is useful to remember Aristotle's view of knowledge as well. According to Aristotle, theoretical reasoning (theory) concerns knowledge that is certain (*episteme*) and practical reasoning (*phronesis*) is concerned with the contingent world of action (*praxis*). *Phronesis* is for its own sake and means of practical wisdom. There is another form of practice which means skill or craft knowledge (*techne*) dealing with the making things (*poiesis*). So, in practice we can distinguish knowing what to do and knowing how to do. They assume theoretical knowledge in the mind as well as in books, and knowledge in practice is the same as experiential knowledge.

Identical to Polanyi's implicit and explicit knowledge, in ancient times *Rishis* and *Maharishis*, who had formulated the fundamental basic principles of *Vaastu Shastra* must have acquired more implicit knowledge than explicit. But over these years, implicit knowledge has slowly been converted to explicit knowledge – for example, scientifically "geomagnetic field" would have been quite difficult for *Rishis* to understand and also it is hard to believe if they had any instrument to measure geomagnetic field thousands of years ago. But the knowledge of such a field was well known to *Maharishis* through *implicit* or intuitive knowledge of wisdom. In *Vaastu Shastra,* one of the most important principles is the concentration of energy.

Vaastu aims at maximizing positive energy around the humans and minimise the negative energy. Some of the important factors for positive energy are sun, geo-magnetic fields, shapes and forms, and geographical position. It is because of these considerations that the important functions are always done when the sun is in the northern hemisphere or *uttarayana*. According to *Vaastu*, while constructing a building both north and east directions are given more importance and it should locate in such a way that a man gets maximum benefit from the solar and cosmic energies (Padam, 1998, pp. 63-69). The science of *Vaastu* aims at controlling the flow of solar energy and geomagnetic energy by selecting proper directions and locations of windows, doors, loads, slopes, planting of trees etc which enhance the energy field for the human being to live in harmony with nature (Sahasrabudhe & Mahatme, 1998, pp.13-29).

Vaastu-Shastra, as an experimental science, experiences design that is made in handling artifacts and is converted by craftsmen. For example – engineer sketches technical artifacts by designs. It concerns a graphic knowledge that the "inner eye" of the technician could be detected and drawn. Technical problems are drawn and shaped. For over 5000 years engineers used designs, in order to show craftsmen, what they have in the sense. The technical innovation begins with a conception of finished equipment (Ferguson, 1993, p. 18). The designs do not obtain figurative, spoken information. Designs make it possible, parts of machines that can be made in different workshops (Irrgang, 2001, p. 112). As such, the knowledge of a technical designer is based on continued experience, which is theoretically like each form of experience, on experimental realizations, observations of materials and systems and on concept.

Conclusion

Vaastu-Shastra has over time become more pragmatically oriented and this has caused it to also become more empirical. It is clear that many of the principles and themes found within *Vaastu-Shastra* resonant with those of many well-known contemporary philosophers of technology. *Vaastu-Shastra* remains a viable and powerful way to meld science and technology within the context of design to create environments for human beings that are in harmony with nature, cosmic forces, and the universe. This practical result is consistent with aims articulated by Carl Mitcham, Albert Borgmann, and Don Ihde as leading philosophers of contemporary technology but does so in a manner that is contextually and spiritually relevant for Indians who are anchored in a culture that is thousands of years old.

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